



ALL-SKY
VIRTUAL
OBSERVATORY

Are we FAIR?

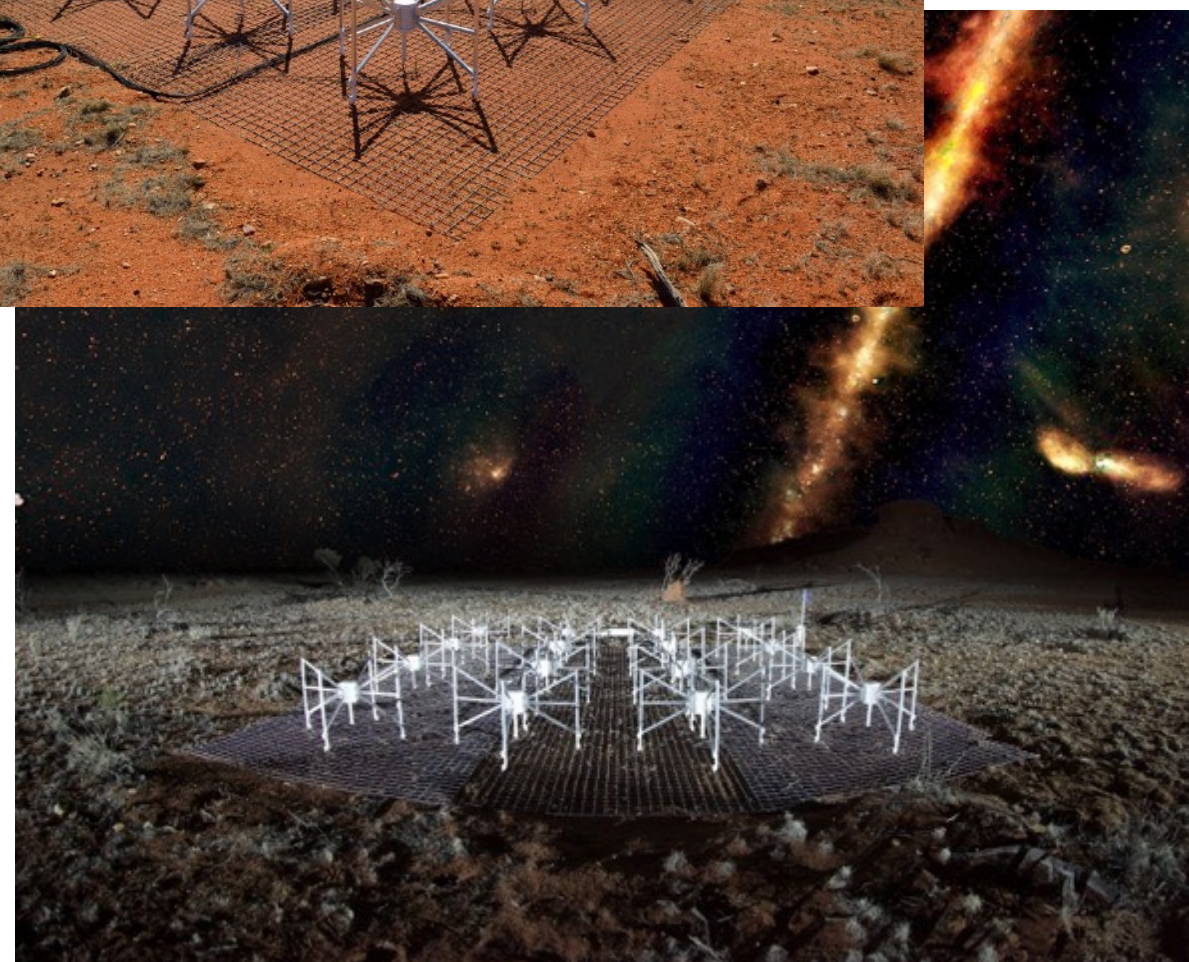


Astronomy
Australia
Ltd.



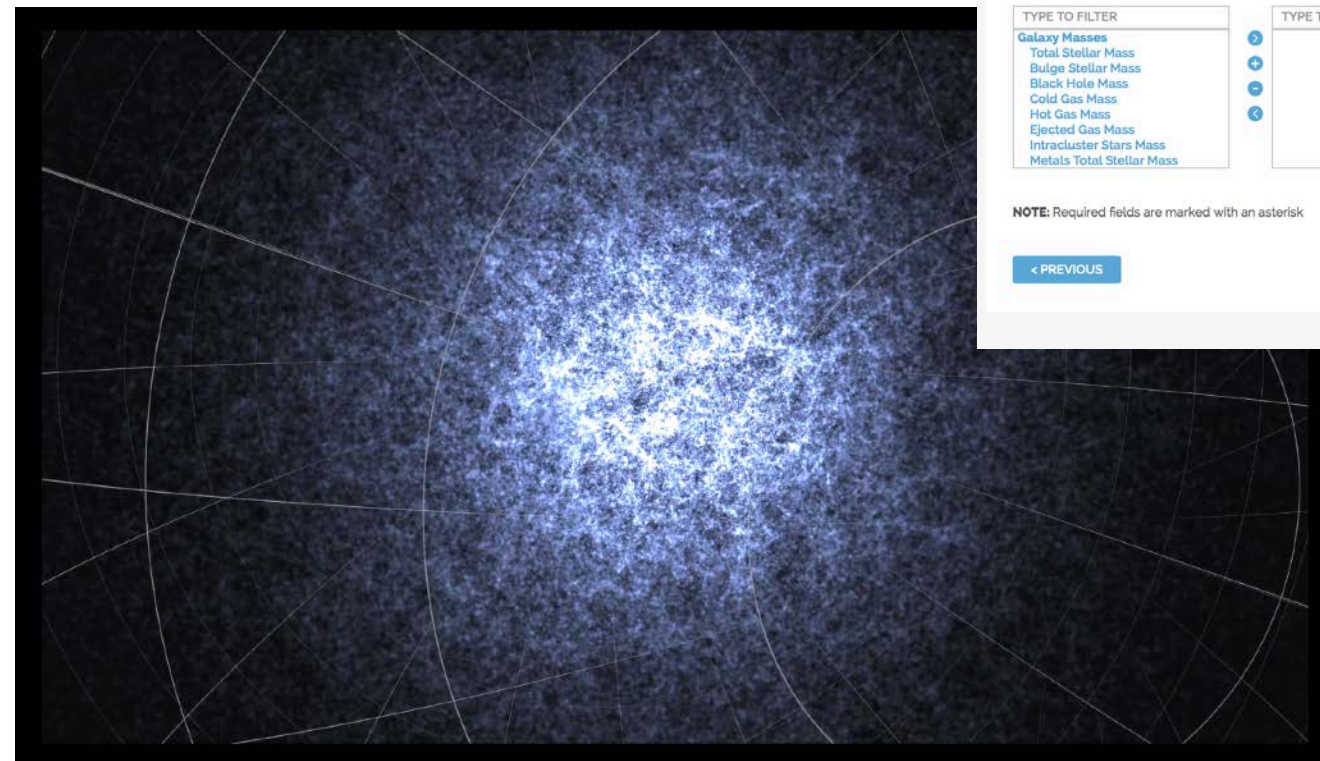
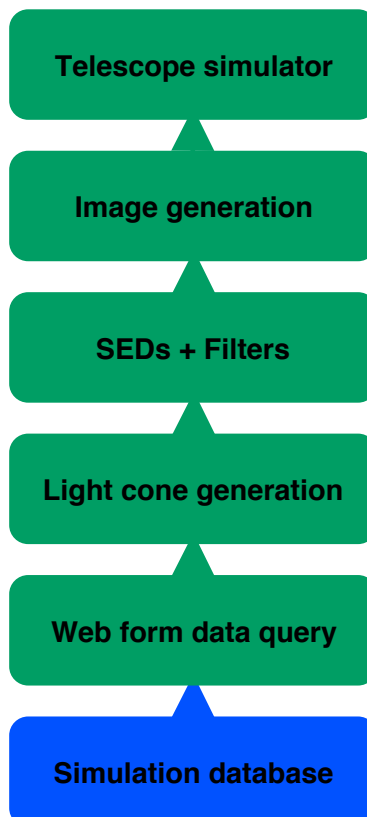
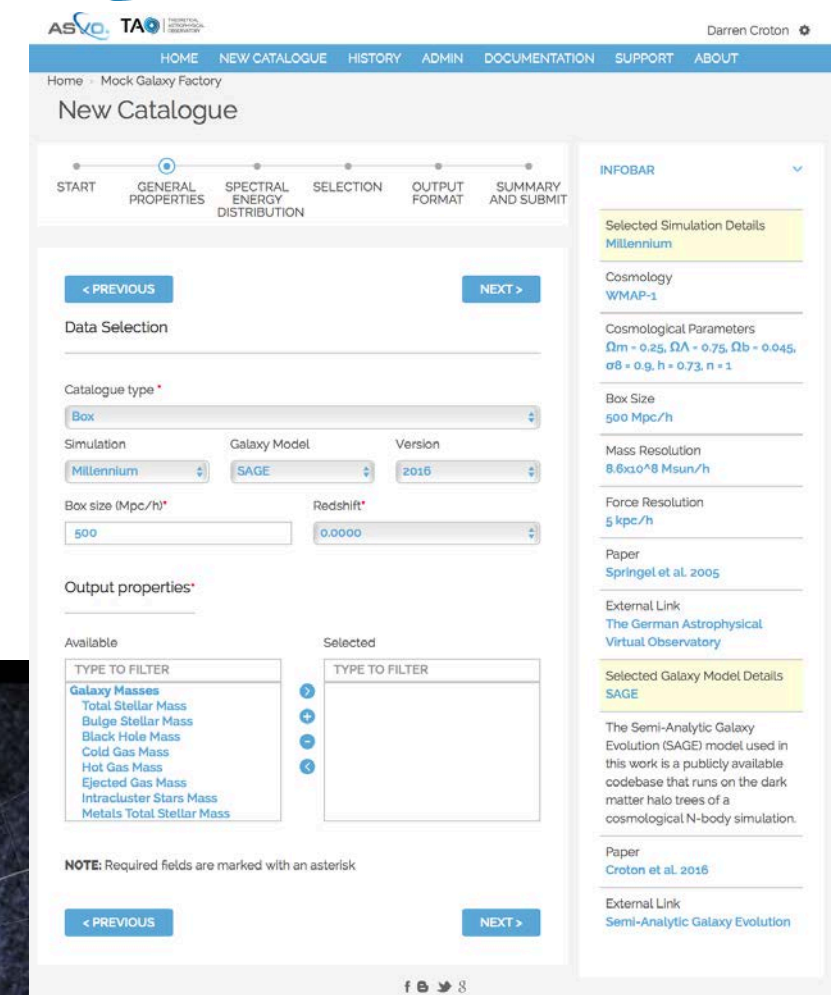
MWA Node

- Summary:
 - **International Consortium led by Curtin University**
 - Low frequency radio telescope (80-300 MHz)
 - Operations began mid-2013
 - Provides pre-processed uncalibrated data
 - One of the 4 SKA precursor telescopes
 - 28Pb publicly available data
 - Each observation 10-100 Gb's in size
 - MWA ASVO averages data into smaller volumes
 - MWA ASVO reduce barriers for astronomer not directly involved in the project by making manageable data



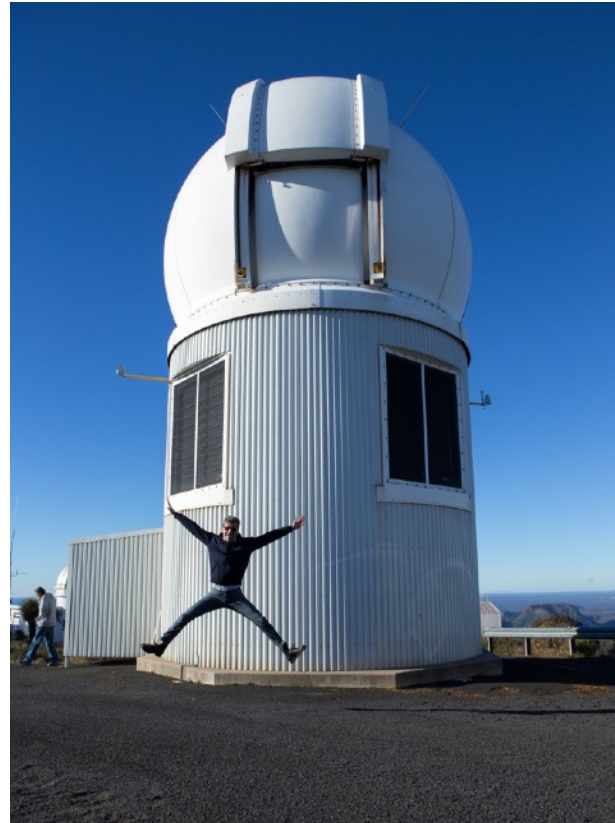
TAO Node

- Summary:
 - **Led by Swinburne University**
 - Cosmological and galaxy formation simulations for astronomers
 - Launched March 2014
 - Over 1000 virtual universes built

Skymapper Node

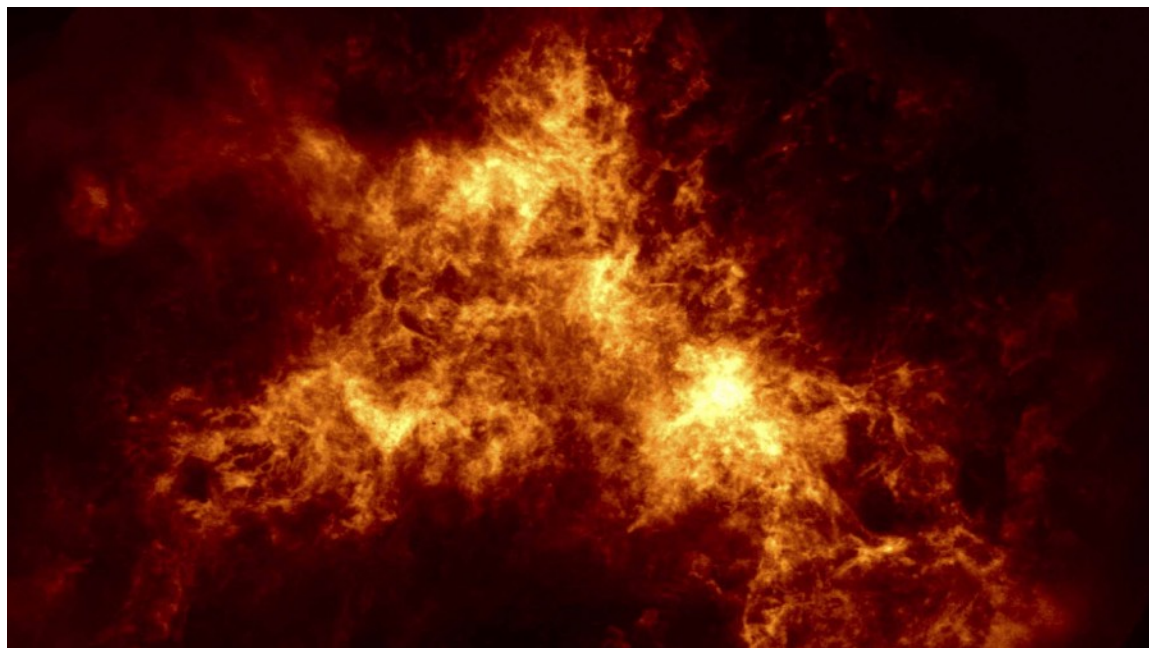
- Summary:
 - Consortium led by Australian National University
 - Specially built 1.3m telescope at SSO
 - Skymapper Southern Sky Survey
 - Digital record of the entire southern sky
 - Multi-epoch, multi-colour processed and calibrated data made available
 - Total survey 1 Pb data
 - 100 Mb data per second
 - First data release 2016





CASDA Node

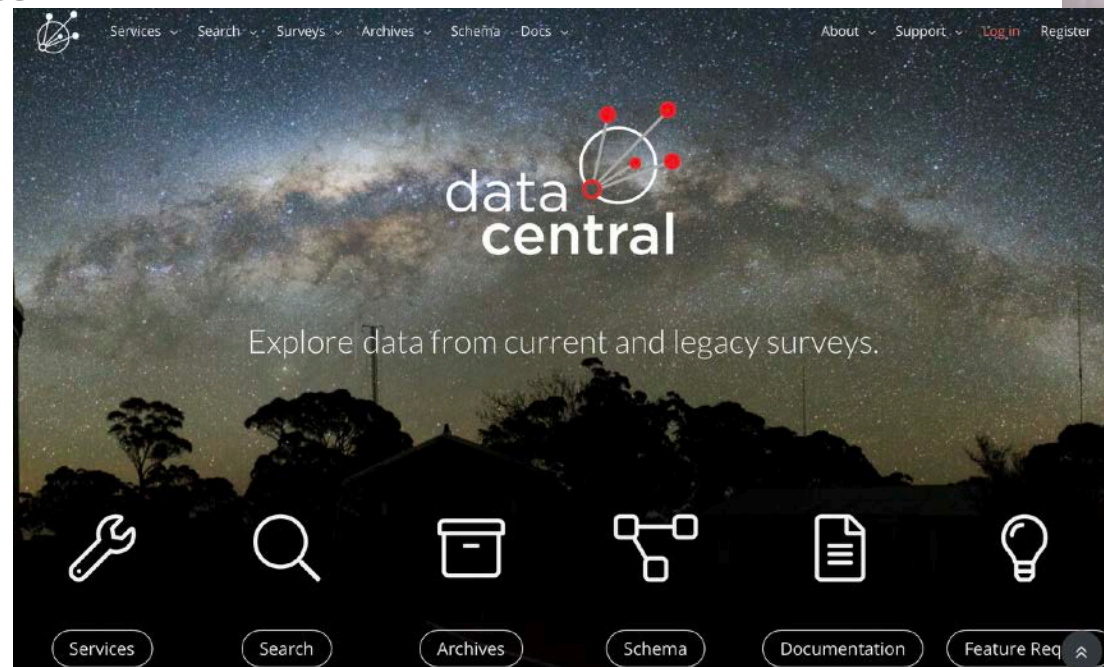
- Summary:
 - **Collaboration - CASS, CSIRO IM & T, Pawsey**
 - CSIRO ASKAP Science Data Archive
 - Data archive Australia SKA Pathfinder
 - Science ready data products
 - 5 Pb data per year (full operational mode)
 - First data release late 2015
 - 36 antenna radio telescope



Data Central Node



- Summary:
 - **AAO-MQ (previously AAO)**
 - Virtual Observatory
 - Launched 2017
 - 0.5Pb, 2020 1Pb
 - AAT legacy data archive, 40 years
 - Survey data (optical and other wavelengths)
 - UI and API access



	Data Central	Skymapper	MWA	CASDA	TAO
Unique id	Y	Y	Y	Y	Y
IVOA standards	Y	Y	Y	Y	Y
TAP protocol	Y	Y	Y	Y	Y
IVOA registered	P	Y	Y	Y	Y
Meta data	Y	Y	Y	Y	Y
DOI	P	Y	P	Y	Y

	Data Central	Skymapper	MWA	CASDA	TAO
IVOA standards	Y	Y	Y	Y	P
TAP protocol	Y	Y	Y	Y	P
UI	Y	Y	Y	Y	Y
Standard data viewers	Y	Y	Y	Y	Y
Standard tools	Y	Y	Y	Y	Y
Access controls	open*	Australia or global	open	open	open

* open after 18 month priority period for AAT data; other surveys are public release

	Data Central	Skymapper	MWA	CASDA	TAO
standard data format	Y	Y	Y	Y	Y
standard metadata	Y	Y	Y	Y	Y
survey IDs provided	Y	Y	Y	Y	Y

	Data Central	Skymapper	MWA	CASDA	TAO
open policy	Y	Y	Y	Y	Y
stable data releases	Y	Y	Y	Y	Y
assigned ids	Y	Y	Y	Y	Y
metadata	Y	Y	Y	Y	Y

	F1	F2	F3	F4	A1	A1.1	A1.2	A2	I1	I2	I3	R1	R1.1	R1.2	R1.3
Data Central	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	P	Y	P	P	Y
Sky mapper	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	P	Y	P	P	Y
MWA	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	P	Y	P	P	Y
CASDA	Y	Y	Y	P	Y	Y	Y	Y	Y	P	P	Y	Y	P	Y
TAO	Y	Y	Y	P	Y	Y	Y	Y	Y	P	P	Y	Y	P	Y

F1. (meta)data are assigned a globally unique and eternally persistent identifier.

F2. data are described with rich metadata.

F3. (meta)data are registered or indexed in a searchable resource.

F4. metadata specify the data identifier.

A1 (meta)data are retrievable by their identifier using a standardized communications protocol.

A1.1 the protocol is open, free, and universally implementable.

A1.2 the protocol allows for an authentication and authorization procedure, where necessary.

A2 metadata are accessible, even when the data are no longer available.

I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

I2. (meta)data use vocabularies that follow FAIR principles.

I3. (meta)data include qualified references to other (meta)data.

R1. meta(data) have a plurality of accurate and relevant attributes.

R1.1. (meta)data are released with a clear and accessible data usage license.

R1.2. (meta)data are associated with their provenance.

R1.3. (meta)data meet domain-relevant community standards.

	F1	F2	F3	F4	A1	A1.1	A1.2	A2	I1	I2	I3	R1	R1.1	R1.2	R1.3
Data Central	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	P	Y	P	P	Y
Sky mapper	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	P	Y	P	P	Y
MWA	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	P	Y	P	P	Y
CASDA	Y	Y	Y	P	Y	Y	Y	Y	Y	P	P	Y	Y	P	Y
TAO	Y	Y	Y	P	Y	Y	Y	Y	Y	P	P	Y	Y	P	Y

F1. (meta)data are assigned a globally unique and eternally persistent identifier.

F2. data are described with rich metadata.

F3. (meta)data are registered or indexed in a searchable resource.

F4. metadata specify the data identifier.

A1 (meta)data are retrievable by their identifier using a standardized communications protocol.

A1.1 the protocol is open, free, and universally implementable.

A1.2 the protocol allows for an authentication and authorization procedure, where necessary.

A2 metadata are accessible, even when the data are no longer available.

I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.

I2. (meta)data use vocabularies that follow FAIR principles.

I3. (meta)data include qualified references to other (meta)data.

R1. meta(data) have a plurality of accurate and relevant attributes.

R1.1. (meta)data are released with a clear and accessible data usage license.

R1.2. (meta)data are associated with their provenance.

R1.3. (meta)data meet domain-relevant community standards.

Summary

SERVICES

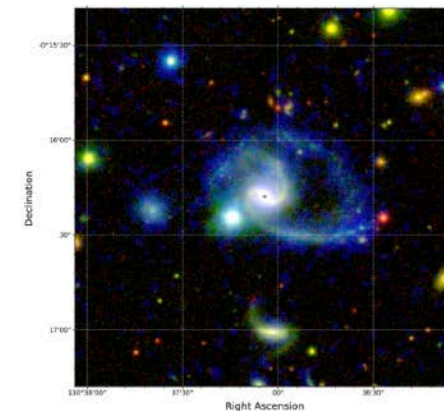
- As community we are working on a shared authorisation and authentication mechanism across the ASVO nodes
- Piloting direct querying across the nodes as well as other international astronomy data archives that use the IVOA standards

STRENGTHENING FAIR

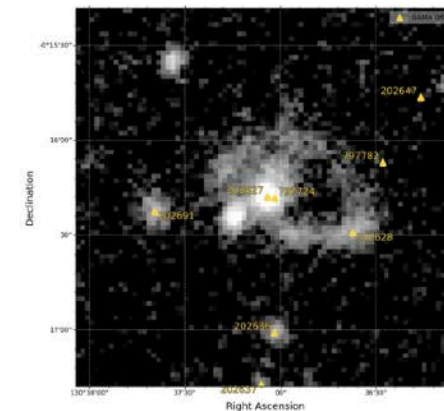
- Sharing knowledge between the nodes so that we strengthen and build our data together to be more FAIR
- Work together collaboratively
- Open data access

RESOURCES

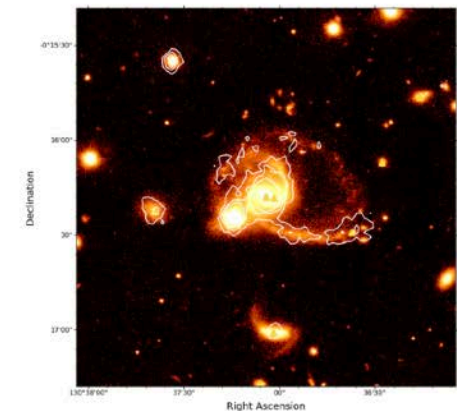
- www.nature.com/scientificdata
- www.force11.org



GAMA galaxy 202627: R: GAMA DR2 VISTA K-band, G: GAMA DR2 VST r-band, B: GAMA DR2 GALEX NUV



GAMA galaxy 202627, GAMA sources overlaid. Image: GAMA DR2 GALEX NUV (log scaling)



GAMA galaxy 202627. Image: VSTKIDS r-band (log scaling), contours: GALEX NUV (4, 8, 12)

The screenshot displays the Data Central web interface. At the top, there's a navigation bar with links for HOME, SERVICES, DOCS, and VERSION 1. Below this, a 'Query' section allows users to submit a SQL/ADQL query to the Data Central database server. A 'New Query' form is visible, including fields for Title, Notes, and the SQL/ADQL query itself. To the right of the query form is a 'Schema Browser' section that provides information on how to construct queries, including a list of tables and columns. Below the query form, there's a 'Data Releases' section with a table listing various data releases from GAMA DR1 to AAT Archive. On the right side of the interface, there's a 'Welcome to Document Central' section for user 'Liz Manning', showing statistics for 82 pages, 44 images, and 0 documents. Below this, a 'YOUR MOST RECENT EDITS' section lists recent changes to documents. At the bottom, there's a 'Documentation' section with a link to find information, examples, and FAQs.